



### PRODUCT OVERVIEW

The D2U5T-H3-7000-54-HU4C is a High Efficiency 3500/7000 watt, power factor corrected, three phase power converter for 230/480VAC lines with a 54VDC main output and a 5V or 3.3V (20W) selectable standby output. The unit is provided with droop sharing and up to three supplies may be operated in parallel.

The supply is hot pluggable. It recovers from over temperature faults, and has status LEDs on the front panel in addition to logic and PMBus status signals.

The 2U package and 23.1W/cubic inch power density make them ideal for delivering reliable, efficient power to servers, workstations, storage systems, broadcast transmitters and many other applications.

### FEATURES

- 7KW (480VAC), 3.5KW (230VAC) Output Power
- High Efficiency; 96% @ 50% FL
- 54VDC Main Output
- 3.3V or 5V Standby Output
- Dims: 5.1"(W) x 18"(L) x 3.3" (2U)
- 23.1 watts/cubic inch power density
- N+1 redundant (including hot docking)
- Droop sharing on Main Output
- Over-voltage, over-current, over-temperature protections
- Internal cooling fan
- I<sup>2</sup>C Bus Interface with status indicators
- RoHS compliant
- Two-year warranty

### ORDERING GUIDE

Model Number	Power Output at 480Vac	Main Output	Standby Output	Airflow
D2U5T-H3-7000-54-HU4C	7000W	54V	3.3V or 5V (selectable)	Back to front

### INPUT CHARACTERISTICS

Parameter	Conditions	Min	Typ	Max	Units
Input Frequency		47	50/60	63	Hz
Input Voltage Operating Range	Range 1	180		264	Vac
	Range 2	320		525	Vac
Turn-on Voltage (Ramp-up)	Range 1		176		Vac
	Range 2		280		Vac
Turn-off Voltage (Ramp-down)	Range 1		150		Vac
	Range 2		260		Vac
Maximum Input Current			15		Arms
Inrush Current	Cold Start			30	Apk
	600W		0.930		
Power Factor, Range 1, 230Vac, 60Hz	1750W (50% FL)		0.990		
	3500W (100% FL)		0.995		
	600W, 480Vac		0.850		
Power Factor, Range 2, 480Vac, 60Hz	3500W (50% FL)		0.990		
	7000W (100% FL)		0.995		

### OVERALL CHARACTERISTICS

Parameter	Conditions	Min	Typ	Max	Units
Output Power	Range 1			3500	W
	Range 2			7000	
Efficiency, Range 1	700W (20%), 230 Vac		89.0		%
	1750W (50%), 230 Vac		93.5		
	3500W (100%), 230 Vac		94.0		
Efficiency, Range 2*	1400W (20%), 480 Vac		94.2		%
	3500W (50%), 480 Vac		96.0		
	7000W (100%), 480 Vac		95.5		

\* See graph on page 8.



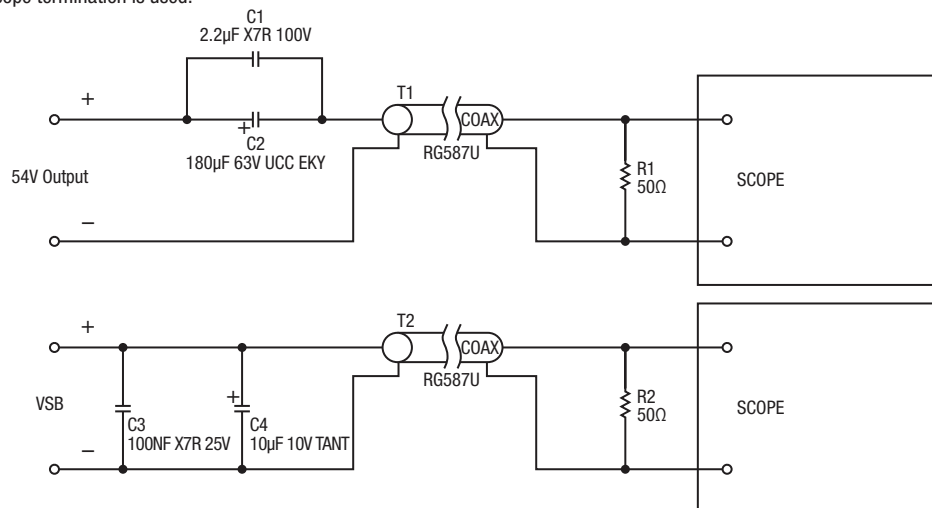
Available now at [www.murata-ps.com/en/3d/acdc.html](http://www.murata-ps.com/en/3d/acdc.html)



OUTPUT VOLTAGE CHARACTERISTICS						
Output	Parameter	Conditions	Min	Typ	Max	Units
54V	Output Current	Range 1	0		64.8	A
		Range 2	0		129.6	
	Voltage Set Point	@32.4A Range 1			54	Vdc
		@64.8A Range 2			54	
	Voltage Droop		Min to Max Current, Range 1		1.5V	
			Min to Max Current, Range 2		3.0V	
	Line Regulation				0.1	%
Ripple Voltage & Noise <sup>1</sup>				0.5	Vp-p	
Load Capacitance			470		5000	μF
3.3VSB	Voltage Set Point			3.30		Vdc
	Line and Load Regulation		3.14		3.46	
	Ripple Voltage & Noise <sup>2</sup>	20MHz Bandwidth			100	mVp-p
	Output Current		0		6	A
	Load Capacitance		20		1000	μF
5VSB	Voltage Set Point			5.00		Vdc
	Line and Load Regulation		4.76		5.24	
	Ripple Voltage & Noise <sup>2</sup>	20MHz Bandwidth			100	mVp-p
	Output Current		0		4	A
	Load Capacitance		20		1000	μF

1 Ripple and noise are measured with 2.2μF (X7R 100V) ceramic + 180μF (UCC EKY) of electrolytic de-coupling capacitors at the output connector load side. A short coaxial cable with 50Ω scope termination is used.

2 Ripple and noise are measured with 0.1μF of ceramic capacitance and 10 μF of tantalum capacitance across the power supply outputs at the output connector load side. A short coaxial cable with 50Ω scope termination is used.



OUTPUT CHARACTERISTICS						
Parameter	Conditions	Min	Typ	Max	Units	
Startup Time	AC ramp up			3	s	
Transient Response <sup>3</sup>	54V, 50-100% load step, 0.1A/μs di/dt		2.4		Vp-p	
	5VSB, 50-100% load step, 1A/μs di/dt		250		mVp-p	
	3.3VSB, 50-100% load step, 1A/μs di/dt		250		mVp-p	
Current sharing accuracy (up to 3 in parallel)	54V @100% load			+/-10	%	
Hot Swap Transients	All outputs within regulation					
Holdup Time	54V @100% load		12		ms	
	VSB @100% Load	100				

3 Minimum output capacitance to be 470μF (low ESR).

GENERAL CHARACTERISTICS						
Parameter	Conditions	Min	Typ	Max	Units	
Storage Temperature Range		-40		70	°C	
Operating Temperature Range		0		50	°C	
Operating Humidity	Non-condensing	10		90	%	
Storage Humidity	Non-condensing	5		90	%	
Altitude (without de-rating at 40°C)	3000				m	
Altitude (without de-rating at 50°C)	1800					
Shock	30G non-operating					
Sinusoidal Vibration	0.5G, 5 – 500 Hz					
MTBF	Calculated per Telcordia SR-332 @40°C	250K			hrs	
Weight			7		kg	
Safety Approvals	c-CSA-us (CSA 60950-1-07/UL 60950-1, Second Edition) TÜV EN 60950-1:2006+A11+A1+A12 IEC 60950-1:2005 (2nd Ed) + A1:2009, and EN 60950-1:2006/A11:2009/A1:2010/A12:2011					
Input Fuses	One internal 16A/500V fast blow fuse on each of the three AC line inputs					
Material Flammability	UL 94V0					
Airflow Direction	From Back (connector side) to Front. Optional Front to Back.					

PROTECTION CHARACTERISTICS						
Output	Parameter	Conditions	Min	Typ	Max	Units
54V	Over-temperature (intake)	Auto-restart	52	55	63	°C
	Over Voltage	Latching, toggling ON/OFF switch unlatches	58	60	62	V
	Over Current Ranges 1 & 2	Hiccup mode. Restart every 500msec. Recovers once load drops below OCP level	105		130	%
3.3VSB	Over Voltage	Latching, AC OFF/ON cycling required to unlatch	3.9		4.3	V
	Over Current	Constant Current Limit (Latches if Output drops below 2V). Hiccup is optional	6.3		9	A
5VSB	Over Voltage	Latching, AC OFF/ON cycling required to unlatch	5.6		6.0	V
	Over Current	Constant Current Limit (Latches if Output drops below 3V). Hiccup is optional	4.2		6	A

EMISSIONS AND IMMUNITY		
Characteristic	Standard	Compliance
Input Current Harmonics	IEC/EN 61000-3-2	Complies
Conducted Emissions	FCC 47 CFR Parts 15	Class A, 6dB margin
Radiated Emissions (in the application)	CISPR 22 EN55022	Class A, 6dB margin
ESD Immunity	IEC/EN 61000-4-2	Level 3 criteria A
Radiated Field Immunity	IEC/EN 61000-4-3	Level 3 criteria B
Electrical Fast Transients/Burst Immunity	IEC/EN 61000-4-4	Level 3 criteria A
Surge Immunity	IEC/EN 61000-4-5	Level 3 criteria A
RF Conducted Immunity	IEC/EN 61000-4-6	Level 3 criteria A
Magnetic Field Immunity	IEC/EN 61000-4-8	3 A/m criteria B
Voltage Dips & Interruptions	IEC/EN 61000-4-11	400Vrms Input Voltage <b>54V &amp; VSB Outputs, Performance a)</b> 100% load, Phase 0°, Dip 100% Duration 10ms 50% load, Phase 0°, Dip 100% Duration 20ms <b>54V &amp; VSB Outputs, Performance b)</b> 100% load, Phase 0°, Dip 100% Duration >10ms Any Load, Phase 0°, Dip 100% Duration >100ms
Voltage imbalance (Circuit will stop when input voltage imbalance exceeds 8% for more than 100ms. Unit will restart when imbalance returns below 8%)		Any valid Input Voltage, any load <b>54V &amp; VSB Outputs, Performance a)</b> Dip 30% on single Phase or Line, Duration 100ms <b>54V &amp; VSB Outputs, Performance b)</b> Dip 30% on single Phase or Line, Duration >100ms

ISOLATION CHARACTERISTICS					
Parameter	Conditions	Min	Typ	Max	Units
Insulation Safety Rating/Test Voltage	Input to Output – Reinforced	3000			Vrms
	Input to Chassis – Basic	1500			Vrms
	Output to Chassis – Functional	500			Vdc

STATUS INDICATORS (LEDs)			
Status Indicators	Input OK (Green)	Output OK (Green)	Fault <sup>5</sup> (Yellow)
AC present and within the regulation range; Standby - ON; Main Output – OFF	Solid Green	Blinking	Off
AC present, but its level is not within the required regulation range	Blinking Green at 1Hz rate (0.5s on, 0.5s off)	Off	Off
When hot-unplugging the power supply from a power shelf <sup>4</sup>	Blinking Green at 1Hz rate (0.5s on, 0.5s off)	Off	Off
AC input voltage is not present	Off	Off	Off
AC present and within the regulation range; Standby – ON; Main Output – ON and both within the regulation range	Solid Green	Solid Green	Off
AC present and within the regulation range; Standby - ON; Main Output - ON; power supply is in a power limit or in an overcurrent condition.	Solid Green	Solid Green	On
Any warning Levels (Input UV/OV, OC, Inlet Temp, Output and STBY OV/UV, OC, OTP, FAN)	No Change	No Change	Blinking 1Hz
Any Fault Levels (Input UV/OV, OC, Inlet Temp, Output and STBY OV/UV, OC, OTP, FAN)	Depends on PS Status	Depends on PS Status	On




4 The Input OK LED blinks to indicate that there is still energy inside the power supply until the input bulk capacitors are completely discharged or the housekeeping circuit is shut down.

5 The Fault LED and PS Fault signal shall be turned on to indicate that there is one or more of the following internal faults currently detected inside the power supply:

- VSB out of range
- Output stage OT
- Fan fault
- ORING fault (Output voltage less than bus voltage)
- OC shutdown
- OT shutdown
- OV shutdown
- Input stage OT
- Fault induced shutdown occurred
- Thermal sensor fault
- Vout out of range
- PFC Boost Vbulk fault

As soon as all of the above faults are removed and the power supply operates normally, the Fault LED and PS Fault signal shall be turned off.

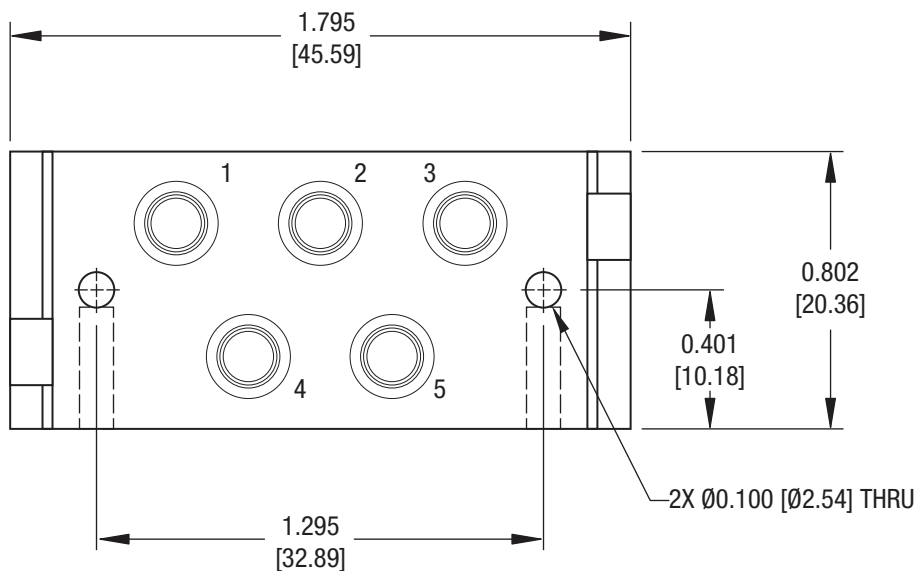
LED Definition: Three LEDs shall be located on the front faceplate, and these are:

LED	Status
	Input OK = ON
	Output OK = ON
	Fault = ON

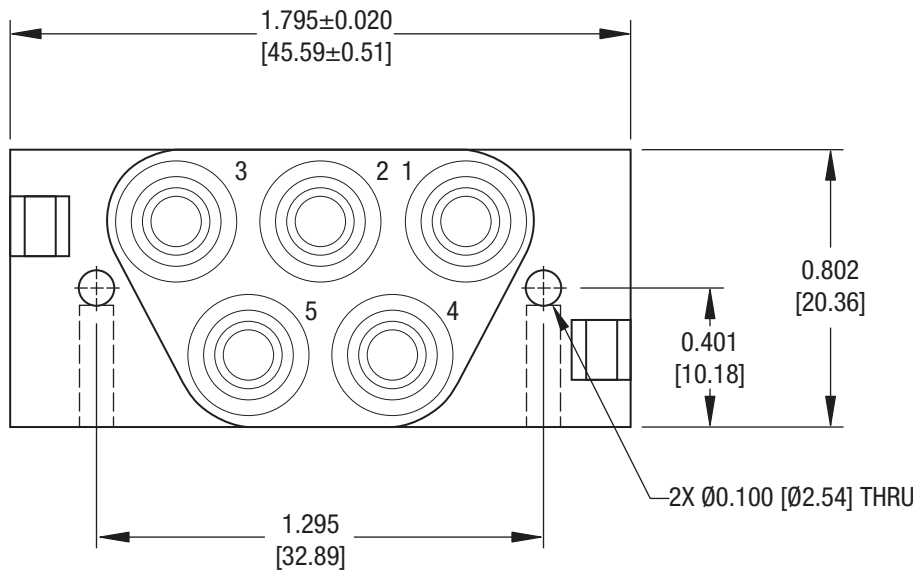
Control Signals	
Signal (I/O)	Description
PS_ON_H (Input)	Internal 10K pull-up resistor to internal VDD <sup>6</sup> <ul style="list-style-type: none"> <li>Leaving signal pin open = Main Output ON</li> <li>Tying signal pin to GND = Main Output OFF</li> </ul>
PS_KILL (Input)	Short pin; internal 10K pull-up resistor to internal VDD <sup>6</sup> <ul style="list-style-type: none"> <li>Leaving signal pin open = All Outputs off</li> <li>Tying signal pin to GND = All Outputs enabled</li> </ul>
PS_FAULT_L (Output)	Internal 10K pull-up resistor to internal VDD <sup>6</sup> <ul style="list-style-type: none"> <li>PSU Fault Status</li> </ul>
PWR_GOOD_H (Output)	Internal 10K pull-up resistor to internal VDD <sup>6</sup> <ul style="list-style-type: none"> <li>Main Output Status OK</li> </ul>
I_SHARE (Input/output -bus)	Analog representation of main output current; can be left open if not used
STBY_SEL_IN (Input)	Internal 10K pull-up resistor to internal VDD <sup>6</sup> <ul style="list-style-type: none"> <li>Leaving signal pin open = +5V STBY</li> <li>Tying signal pin to GND = 3V3STBY</li> </ul>
AC_OK_H (Output)	Internal 10K pull-up resistor to internal VDD <sup>6</sup> <ul style="list-style-type: none"> <li>AC OK Status</li> </ul>
SMB_ALERT_L (Output)	Internal 10K pull-up resistor to internal VDD <sup>6</sup> <ul style="list-style-type: none"> <li>SMB Alert signal output</li> </ul>

6 VDD depends on Standby Voltage selection of either 3.3V or 5V.

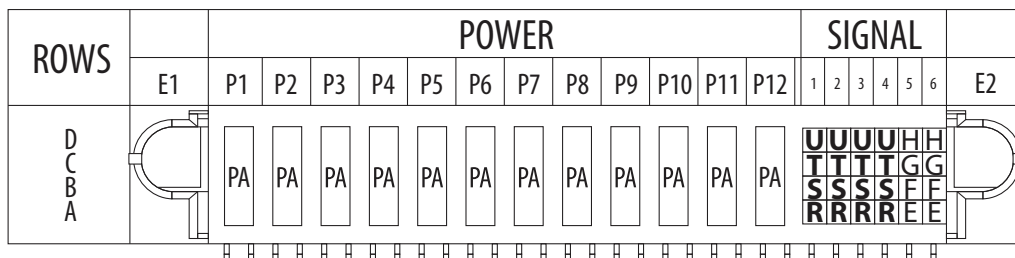
AC POWER CONNECTOR			
Header	Positronic PLS5W5F1000		
	Position	Part Number	Function
Contacts	1	Positronic: FS612N2	Safety Ground
	2	Positronic: FS612N2	AC Line Voltage Ph 1
	3	-	Not fitted
	4	Positronic: FS612N2	AC Line Voltage Ph 2
	5	Positronic: FS612N2	AC Line Voltage Ph 3



CUSTOMER AC POWER CONNECTOR			
Header	Positronic PLS5W5M1000		
Contacts	Position	Part Number	Function
	1	Positronic: MS612N	Safety Ground
	2	Positronic: MS612N-228.2	AC Line Voltage Ph 1
	3	-	Not fitted
	4	Positronic: MS612N-228.2	AC Line Voltage Ph 2
5	Positronic: MS612N-228.2	AC Line Voltage Ph 3	
<p><b>NOTE: The Safety Ground MUST mate first. The Customer SHALL use the longer pin specified for position 1 and the shorter pins specified for positions 2, 4 and 5.</b></p>			



OUTPUT CONNECTOR	
Connector:	FCI Power Blade. Right Angle Header, 24 Signal Pins & 12 Power Blades. Part # 51939-486LF
Mating connector option #1:	FCI Power Blade. Right Angle Connector, 24 Signal Pins & 12 Power Blades. Part # 51915-132
Mating connector option #2:	FCI Power Blade. Straight Connector, 24 Signal Pins & 12 Power Blades. Part # 51940-323

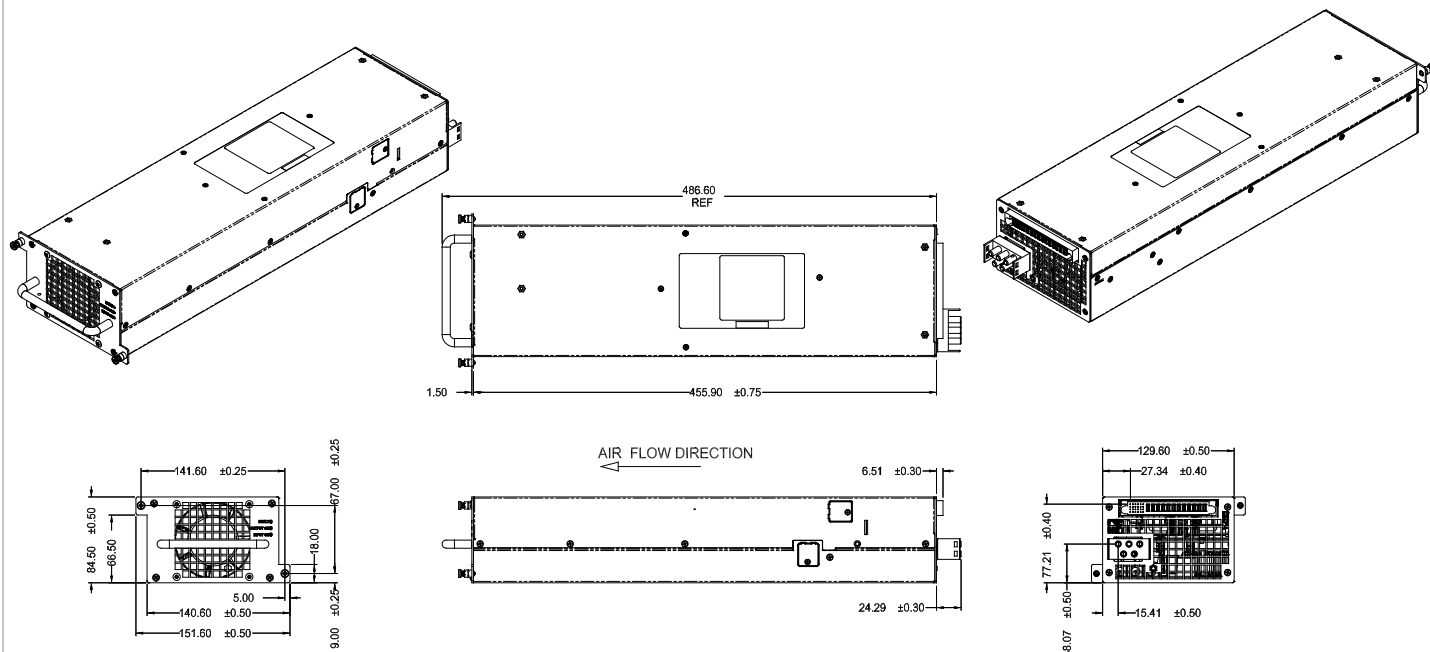


### OUTPUT CONNECTOR & SIGNAL PIN ASSIGNMENT

Connector: FCI Power Blade Part # 51939-486LF

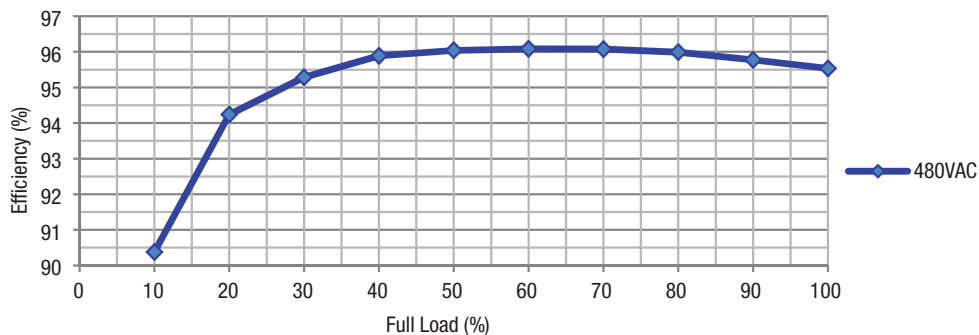
Power Blade Number	Signal	Function	Signal Direction
P12	+VOUT	54Vdc	Output
P11	+VOUT	54Vdc	Output
P10	+VOUT	54Vdc	Output
P9	-VOUT	54Vdc Return	Output
P8	-VOUT	54Vdc Return	Output
P7	-VOUT	54Vdc Return	Output
P6	-VOUT	54Vdc Return	Output
P5	-VOUT	54Vdc Return	Output
P4	-VOUT	54Vdc Return	Output
P3	+VOUT	54Vdc	Output
P2	+VOUT	54Vdc	Output
P1	+VOUT	54Vdc	Output
Signal Pin Number	Signal	Function	Signal Direction
A1	A1	I2C Address Bit 1 Signal	Input
A2	PS_FAULT_L	PSU Fault Status	Output
A3	A0	I2C Address Bit 0 Signal	Input
A4	VSB_RTN	VSTBY_RTN	Output
A5	SCL	I2C Clock Signal	Bi-Directional
A6	VOUT_SENSE+	VOUT_SENSE+	Input
B1	A2	I2C Address Bit 2 Signal	Input
B2	PS_ON_H	Enable PSU	Input
B3	+VSB	+3.3V/5V STBY Out	Output
B4	VSB_RTN	VSTBY_RTN	Output
B5	PS_KILL	Enable PSU Shortest pin of the connector	Input
B6	N/A	Reserved No User Connection	Output
C1	STBY_SEL_IN	Selects +3V3 or +5VSTBY	Input
C2	AC_OK_H	AC(DC) OK Status	Output
C3	+VSB	+3.3V/5V STBY Out	Output
C4	VSB_RTN	VSTBY_RTN	Output
C5	SDA	I2C Data Signal	Bi-Directional
C6	VOUT_SENSE-	VOUT_SENSE-	Input
D1	SMB_ALERT_L	SMB Alert signal output	Output
D2	PWR_GOOD_H	Power OK Status	Output
D3	+VSB	+3.3V/5V STBY Out	Output
D4	VSB_RTN	VSTBY_RTN	Output
D5	VSB_RTN	VSTBY_RTN	Output
D6	VSB_RTN	VSTBY_RTN	Output

**MECHANICAL DIMENSIONS**



Dimensions: 5.1" x 18" x 3.3" [129.5mm x 455.9mm x 84.5mm]

**EFFICIENCY**



**OPTIONAL ACCESSORIES**

Description	Part Number
54V D2U5T Output Connector Card	D2U5T-54-CONC

**APPLICATION NOTES**

Document Number	Description	Link
ACAN-55	D2U5T PMBus™ Communication Protocol	<a href="http://power.murata.com/datasheet/?data/apnotes/acan-55.pdf">http://power.murata.com/datasheet/?data/apnotes/acan-55.pdf</a>
ACAN-56	D2U5T Output Interface Connector Card	<a href="http://power.murata.com/datasheet/?data/apnotes/acan-56.pdf">http://power.murata.com/datasheet/?data/apnotes/acan-56.pdf</a>

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